STATE OF NEW MEXICO
NEW MEXICO WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF PROPOSED NEW REGULATION, 20.2.50 NMAC – *Oil and Gas Sector – Ozone Precursor Pollutants*

No. EIB 21-27 (R)

ENVIRONMENTAL DEFENSE FUND'S NOTICE OF INTENT TO PRESENT REBUTTAL TESTIMONY

Pursuant to 20.6.1.202.A NMAC and the Procedural Order issued in this matter, Environmental Defense Fund (EDF) hereby files its Notice of Intent to Present Rebuttal Testimony.

Joint Proposed *Revised* Amendments to Proposed 20.2.50 NMAC from EDF, Clean Air Advocates, Center for Civic Policy, and NAVA Education Fund

On July 28, 2021, the Environmental Defense Fund, along with Clean Air Advocates, Center for Civic Policy, and NAVA Education Project, filed Joint Proposed Amendments to Proposed 20.2.50 NMAC, along with direct testimony and exhibits in support.

After the initial filings, Occidential Petroleum Inc., ("Oxy"), a party in this proceeding, approached our coalition to see if we could find common ground on each other's proposals. We met over the course of several weeks, and have agreed upon certain, but not all, provisions in the proposed rule. Joint rebuttal redline, EDF Ex. VV.

Importantly, *Oxy has agreed to all four of EDF's proposals*, with certain slight modifications reflected in EDF Ex. VV. These proposals, if adopted, would result in significant reductions in harmful pollutants, as demonstrated by the direct testimony provided by Hillary Hull, EDF Ex. SS and David Lyon., EDF Ex. RR. These proposals:

- Increase the frequency of leak detection and repair inspections at wellhead sites located within 1,000 feet of homes, schools, and businesses in order to achieve

additional reductions in VOC emissions at facilities located in close proximity to homes, schools and outdoor recretation areas;

- Increase the timetable to retrofit gas-powered pneumatic controllers with zero emitting devices and require operators to inspect gas-powered pneumatic controllers as part of instrument monitoring requirements.
- Require the control of flowback vessels to reduce emissions from the completion and recompletion of wells; and
- Require automatic vessel measurement systems on new storage vessels to minimize venting of emissions from those devices and enhance worker safety.

EDF, Clean Air Advocates, Center for Civic Policy, and NAVA Education Project have agreed to a number of Oxy's proposed revisions, with some modifications, and have proposed several new definitions. As set forth in the rebuttal testimony of Tom Alexander and David Lyon, we believe these joint proposed revisions improve the workeability, clarity, and technical feasibility of the rule. We respectfully urge the EIB to take into consideration the joint proposals that represent the collective thinking of the second largest oil company in the state and a coalition of non-governmental organizations.

Rebuttal Testimony and Exhibits

As required by 20.1.1.302.A NMAC and the Procedural Order, EDF provides the following information in this notice:

A. Identify the person(s) for whom the witnesses will testify in rebuttal:

The five witness identified below will testify in rebuttal on behalf of EDF.

B. Identify each technical witness the person intends to present for rebuttal testimony, and state the qualifications of that witness, including a description of their educational and work background:

EDF intends to present:

- Tom Alexander, Consultant, whose educational and work background is set forth in his curriculum vitae, which is EDF's Exhibit KK;
- David Lyon, Ph.D, Senior Scientist with EDF, whose educational and work background is set forth in his curriculum vitae, which is EDF's Exhibit B;
- Hillary Hull, Director of Research and Analytics for EDF, whose educational and work background is set forth in her resume, which is EDF's Exhibit P;
- Maureen Lackner, Manager, Economics & Policy for EDF, whose educational and work background is set forth in her resume, which is EDF's Exhibit FFF; and
- Tammy Thompson, PhD, Senior Air Quality Scientist for EDF, whose educational and work background is set forth in her resume, which is EDF's Exhibit FF.

C. Include a copy of the rebuttal testimony of each technical witness in narrative form:

As required by the Procedural Order, ¶ 3, EDF submits the full written rebuttal testimony of:

- Tom Alexander in Exhibit WW.
- David Lyon in Exhibit XX.
- Hillary Hull in Exhibit JJJ.
- Maureen Lackner in Exhibit EEE.
- Tammy Thompson in Exhibit BBB.

D. Include the text of any recommended modifications to the proposed regulatory change:

A text of the modifications to 20.2.50 NMAC proposed by EDF is attached as Exhibit VV.

E. List and attach all exhibits anticipated to be offered by that person at the hearing:

Below is a list of all direct and rebuttal exhibits to be offered by EDF in support of its direct testimony. EDF's direct exhibits were filed July 28, 2021. EDF's rebuttal exhibits are attached. EDF reserves the right to offer sur-rebuttal exhibits.

DIRECT

Exhibit	Description
A.	EDF's proposed revisions to NMED's Proposed Oil and Gas Sector-Ozone Precursor Pollutants Rule, 20.2.50 NMAC (May 6, 2021)
B.	Resume of David Lyon
C.	Alvarez et al., *Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain*, 361 SCI. 186-88 (2018), https://science.sciencemag.org/content/361/6398/186.
D.	*Permian Methane Analysis Project*, EDF, https://www.permianmap.org/.
E.	Zhang et al., *Quantifying Methane Emissions from the Largest Oil-Producing Basin in the United States from Space*, 6 SCI. ADVANCES, Apr. 22, 2020, https://advances.sciencemag.org/content/6/17/eaaz5120.
F.	Robertson et al., *New Mexico Permian Basin Measured Well Pad Methane Emissions Are a Factor of 5–9 Times Higher Than U.S. EPA Estimates*, 54:21 ENVTL. SCI. TECHNOL. 13926-13934 (2020), https://pubs.acs.org/doi/10.1021/acs.est.0c02927.
G.	Lyon et al., *Concurrent Variation in Oil and Gas Methane Emissions and Oil Price During the COVID-19 Pandemic*, ATMOS. CHEM. PHYS. DISCUSS (in review, Dec. 11, 2020), https://doi.org/10.5194/acp-2020-1175.
H.	Cusworth et al., *Intermittency of Large Methane Emitters in the Permian Basin*, 8:7 Envtl. Sci. Technol. Lett. 567-573 (June 2, 2021), https://pubs.acs.org/doi/10.1021/acs.est.0c02927.
I.	Irakulis-Loitxate et al., *Satellite-Based Survey of Extreme Methane Emissions in the Permian Basin*, 7:27 Sci. Adv. (June 30, 2021), https://advances.sciencemag.org/content/advances/7/27/eabf4507.full.pdf.
J.	Allen et al., *Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Liquid Unloadings*, 49:1 Envtl. Sci. Technol. 641–648 (2015) ("Allen et al., 2015"), http://pubs.acs.org/doi/abs/10.1021/es504016r.
K.	EPA, Lessons Learned from Natural Gas Star Partners: Options for Reducing Methane Emissions from Pneumatic Devices in the Natural Gas Industry, Appendix 1 (2006), https://19january2017snapshot.epa.gov/sites/production/files/2016-06/documents/ll_pneumatics.pdf.

L.	Allen et al., Measurements of methane emissions at natural gas production sites in the United States, 110 Proc. Natl. Acad. 18,023 (Oct. 29, 2013) ("Allen et al., 2013"), http://www.pnas.org/content/110/44/17768.full.
M.	ERG and Sage Environmental Consulting, LP, *City of Fort Worth Natural Gas Air Quality Study, Final Report.* (July 13, 2011) ("Fort Worth Study") https://www.fortworthtexas.gov/files/assets/public/development-services/documents/gaswells/ergreport-section-3.pdf.
N.	The Prasino Group, *Determining bleed rates for pneumatic devices in British Columbia; Final Report* 19 (Dec. 18, 2013) http://www.bcogris.ca/sites/default/files/ei-2014-01-final-report20140131.pdf.
O.	Carbon Limits, Quantifying Cost-effectiveness of Systematic Leak Detection and Repair Program Using Infrared Cameras (Mar. 2015), https://www.catf.us/wp-content/uploads/2014/03/CATF_FactSheet_FixingTheLeaks.pdf.
P.	Resume of Hillary Hull.
Q.	Smith et al., Airborne Quantification of Methane Emissions over the Four Corners Region, 51 Envtl. Sci. Technol. 5832 (2017), https://www.scientificaviation.com/wp-content/uploads/2019/04/smith_4Corners_2017.pdf.
R.	Allen et al., *Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Pneumatic Controllers*, 49:1 Envtl. Sci. Technol. 633 (Dec. 9, 2014), https://pubs.acs.org/doi/abs/10.1021/es5040156.
S.	EDF source-level methane inventory at all well sites in New Mexico for 2019.
T.	O&G Emissions Inventory Project: Greater San Juan and Permian Basin, Western Regional Air Partnership ("WRAP"), https://www.wrapair2.org/SanJuanPermian.aspx.
U.	Oil and Natural Gas Sector: Standards for Crude Oil and Natural Gas Facilities, Background Technical Support Document for the Proposed New Source Performance Standards 40 CFR Part 60, subpart OOOOa (Aug. 2015).
V.	Colorado Air Quality Control Commission rule, 5 C.C.R., 1001-9, D.
W.	Map of wells within the affected counties (proximity boundary).
X.	Proximity Dataset Table
Y.	Control Techniques Guidelines for the Oil and Natural Gas Industry Table 9-13, EPA (Oct. 2016), https://www3.epa.gov/airquality/ctg_act/2016-ctg-oil-and-gas.pdf.
Z.	Background Technical Support Document, Proposed Reconsideration of the New Source Performance Standards 40 C.F.R. Part 60, subpart OOOOa (Sept. 2018).
AA.	Analysis of OOOOa Annual Air Emission Reports, MJB&A (Dec. 11, 2018).
BB.	Cost-Benefit Analysis, Colorado Department of Public Health and Environment ("CDPHE") (Feb. 7, 2014).
CC.	California Air Resources Board ("CARB"), *Summary of Cost, Emissions, and Cost per Ton using the 20 year and 100 year GWP, respectively* (revised Feb. 17, 2017).
DD.	American Community Survey Data, United States Census Bureau, https://www.census.gov/programs-surveys/acs/data.html and Places:Local

	Data for Better Health, Centers for Disease Control and Prevention, https://www.cdc.gov/places/index.html.
EE.	Cost-Benefit Analysis, Regulation 7, CDPHE (Sept. 4, 2020).
FF.	Resume of Tammy M. Thompson
GG.	Preventing Disease Through Healthy Environments, WHO (2010), https://www.who.int/ipcs/features/benzene.pdf.
HH.	National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65292, 65322 (Oct. 26, 2015), https://www.govinfo.gov/app/details/FR-2015-10-26/2015-26594.
II.	Final Report: Human Health Risk Assessment for Oil and Gas Operations in Colorado, ICF (Oct. 17, 2019) (submitted to CDPHE), https://drive.google.com/file/d/1pO41DJMXw9sD1NjR_OKyBJP5NCb-AO0I/view.
JJ.	State of New Mexico Environmental Improvement Board, IN THE MATTER OF PROPOSED NEW REGULATION, 20.2.50 NMAC – Oil and Gas Sector – Ozone Precursor Pollutants No. EIB 21-27 (R), Petition for Regulatory Change, https://www.env.nm.gov/air-quality/wp-content/uploads/sites/2/2021/03/2021-05-06-EIB-21-27-Petition-for-Regulatory-Change-Part-20.2.50-pj.pdf.
KK.	Resume of Tom Alexandar
LL.	Pneumatic Controller Task Force Report to the Air Quality Control Commission, Colorado Air Pollution Control Division, (June 1, 2020), https://drive.google.com/file/d/1JStgs0SD2NvZIht1Ti8QQnJAmUZxKgsn/view.
MM.	Economic Impact Analysis (Final) for Regulation 7, AQCC (Oct. 4, 2017).
NN.	Economic Impact Analysis (Final Analysis) for Regulation 7 (Nov. 5, 2019).
OO.	California Air Resources Board, Standards for Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities, Section 95668(e)(2), https://casetext.com/regulation/california-code-of-regulations/title-17-public-health/division-3-air-resources/chapter-1-air-resources-board/subchapter-10-climate-change/article-4-regulations-to-achieve-greenhouse-gas-emission-reductions/subarticle-13-greenhouse-gas-emission-standards-for-crude-oil-and-natural-gas-facilities/section-95668-standards.
PP.	Ohio General Permit.18.1, C.1.(d)(3)(b), https://epa.ohio.gov/Portals/27/genpermit/GP18.1_F20170210.pdf.
QQ.	Rutherford, Jeffrey S. et al., *Closing the Gap: Explaining Persistent Underestimation by US Oil and Natural Gas Production-Segment Methane Inventories*, EARTHARXIV (in review), https://eartharxiv.org/repository/object/1793/download/3784/.
RR.	Direct testimony of David Lyon
SS.	Direct testimony of Hillary Hull
TT.	Direct testimony of Tammy M. Thompson
UU.	Direct testimony of Tom Alexander

REBUTTAL

Exhibit	Description	Page

VV.	Joint Proposed Revised Amendments to Proposed 20.2.50 NMAC	1
WW.	Rebuttal Testimony of Tom Alexander	36
XX.	Rebuttal Testimony of David Lyon	44
YY.	Deighton, Jacob A. et al., *Measurements show that marginal wells are a disproportionate source of methane relative to production*, 70(10) J. AIR & WASTE MGMT. ASSOC. 1030 (Aug. 2020).	56
ZZ.	Omara, M. et al., *Methane Emissions from Natural Gas Production Sites in the United States: Data Synthesis and National Estimate*, 52 ENVTL. SCI. TECHNOL. 12915 (Sept. 2018).	70
AAA	Allen et al., *Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Liquid Unloadings*, 49:1 ENVTL. SCI. TECHNOL. 641–648 (2015).	82
BBB.	Rebuttal Testimony of Tammy Thompson	91
CCC.	Nolte, Christopher G. et al., *The potential effects of climate change on air quality across the conterminous US at 2030 under three Representative Concentration Pathways*, Atmospheric Chemistry and Physics (Oct. 29, 2018).	96
DDD	Porter, William C. and Heald, Colette L., *The mechanisms and meteorological drivers of the summertime ozone–temperature relationship*, Atmospheric Chemistry and Physics (Oct. 30, 2019).	116
EEE.	Rebuttal Testmony of Maureen Lackner	132
FFF.	Resume of Maureen Lackner	137
GGG	Interagency Working Group on Social Cost of Greenhouse Gases, United States Government, Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, February 2021	140
HHH	Carleton, Tamma and Greenstone, Michael, Updating the United States Government's Social Cost of Carbon (January 14, 2021). University of Chicago, Becker Friedman Institute for Economics Working Paper No. 2021-04	189
III.	Marcy Lowe and Robin Lowe-Skillern, Datu Research, Find, Measure, Fix: Jobs in the U.S. Methane Emissions Mitigation Industry (2021)	240
JJJ.	Rebuttal Testimony of Hillary Hull	301

Respectfully submitted,

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Certificate of Service

I certify that a copy of the foregoing pleading was emailed to the following counsel on September 7, 2021:

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